exhibiting an LCST is between the temperatures T1 and T2 and more preferably between about 20 and 50°C.

For the purposes of the invention, the expression electrolyte is understood to mean a condensed medium capable of conducting ions. In the most common case, this medium is a buffered aqueous medium, such as buffers based on phosphate, tris(hydroxymethyl)amino-methane (TRIS), borate, N-tris(hydroxymethyl)methyl-3-aminopropanesulphonic acid (TAPS), histidine, lysine, and the like. Numerous examples of buffers which can be used in electrophoresis are known to persons skilled in the art, and a number of them are described for example in Sambrook et al., "Molecular Cloning: a laboratory manual", Cold Spring Harbor Lab, New York, 1989. However, any type of electrolyte may be used in the context of the invention, in particular aqueous-organic solvents such as, by way of example, water-acetonitrile, water-formamide or water-urea mixtures, polar organic solvents such as, again by way of example, N-methylformamide. Particularly useful in the context of the invention are the electrolytes termed "sequencing buffers", consisting of an aqueous buffer at alkaline pH supplemented with a substantial proportion of urea and/or of formamide.

For the purposes of the invention, the term "species" is understood to mean analytes in general. These analytes may be particles, organelles or cells, molecular or macromolecular species, and in particular biological macromolecules such as nucleic acids (DNA, RNA, oligonucleotides), nucleic acid analogues obtained by chemical modification or synthesis, proteins, polypeptides, glycopeptides and polysaccharides whose complete or partial separation is desired during their electrokinetic migration within the said separation medium.

For the purposes of the invention, the expression "polymeric segment" or "segment" is understood to mean a set of monomers covalently linked to each other and having specific physicochemical properties, in particular as regards solvation. One example of a polymeric segment for the purposes of the invention is given by a chain of monomers which are all identical (homopolymeric segment), or a copolymer exhibiting no significant correlation in composition over lengths of more than a few monomers (segment of the random copolymer type).

For the purposes of the invention, the expression block copolymer is understood to mean a copolymer consisting of polymeric segments having significantly different compositions, covalently linked to each other. The block copolymer is defined by the fact that each of the segments comprises a sufficient number of monomers so as to exhibit in the electrolyte physicochemical and, in particular, solvation properties which are comparable to those of a homopolymer having the same composition and the same size. It is distinguishable from the random polymer in which the various types of monomer follow each other in an essentially random manner, and locally confer overall properties on the chain which are different from those of the homopolymers of each of the species in question. The size of the homopolymeric segments necessary for obtaining this block character may vary according to the types of monomer and the electrolyte, but it is typically a few tens of atoms along the skeleton of the said segment. It should be noted that it is possible to constitute a block copolymer within the meaning of the invention, in which some or all of the segments themselves consist of a random-type copolymer in so far as it is possible to distinguish within the said block copolymer zones or segments having a size and a difference in chemical composition which are sufficient to give rise, from one segment to another, to a

significant variation in the physicochemical, and in particular solvation, properties. Finally, the expression "noncontiguous polymeric segments" within a block polymer is understood to mean two segments linked to each other by a polymeric segment of a different nature.

The block copolymers suitable for the invention possess the feature of combining at least two types of segment in their structures.

The first type of segment is soluble in the electrolyte used for the separation at the two temperatures T1 and T2 for using the claimed medium and preferably do not exhibit an LCST in the said electrolyte. In the present context, the term soluble is understood to refer to solubility in the electrolyte at the temperatures T1 and T2.

On the other hand, the second type of segments is endowed with an LCST in the electrolyte used for the separation. More precisely, this type of segment is essentially soluble in the said electrolyte in a range of low temperatures, and is essentially insoluble in the said electrolyte in a range of high temperatures. The limit between these two temperature ranges is called "minimum demixing temperature" or more commonly "LCST".

By virtue of the presence of these segments with LCST at the level of their structure, the copolymers used according to the invention possess the property of constituting, at low temperature, a macroscopically homogeneous entangled solution in which the interactions between various polymer molecules are essentially repulsive, and of giving rise, following an increase in temperature, to attractive interactions between some of their parts which strengthen the disentangling interactions between chains.